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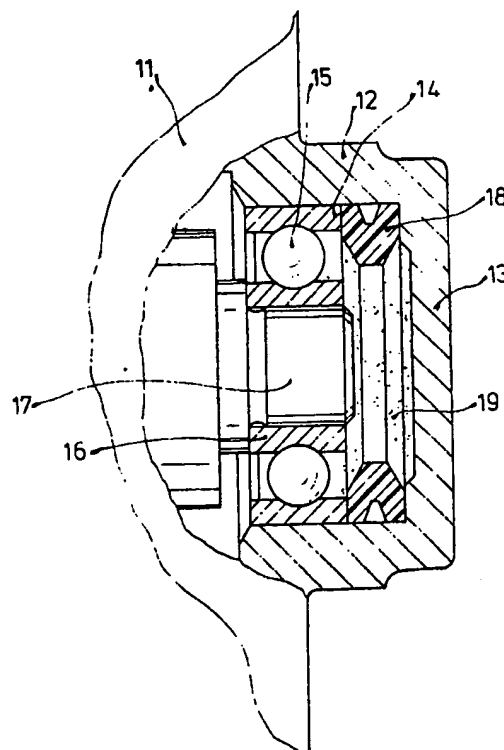
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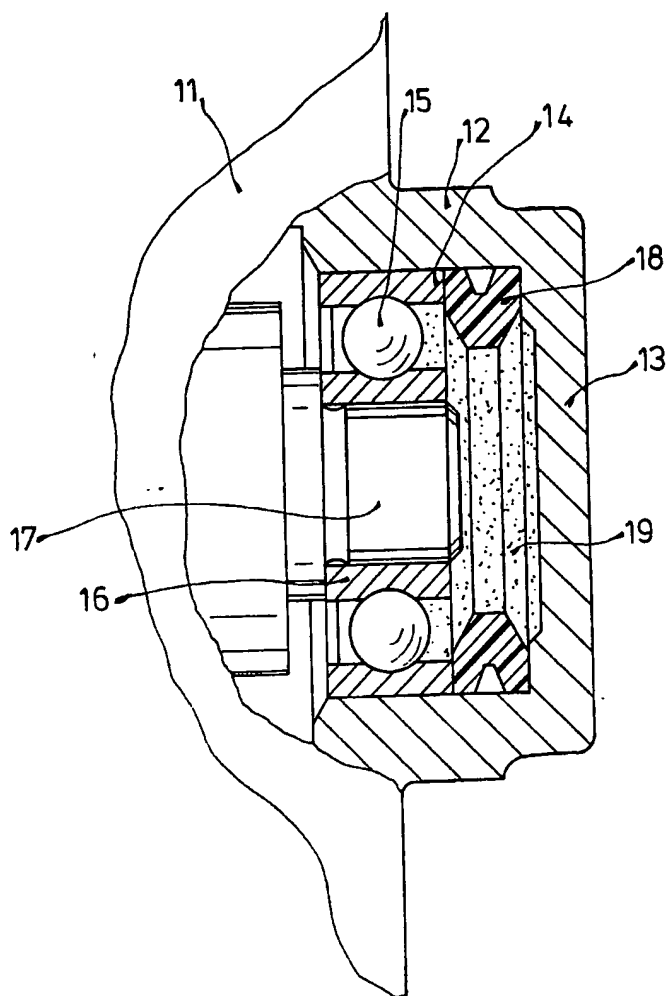
(54) A bearing device for shafts

(57) A shaft bearing for electrical machines comprises a ball bearing and a plastics ring of V-shaped cross section disposed between, and in abutment with, an outer race (14) of the bearing and a base (13) of a bearing housing (12). The ring serves as a single element for axial adjustment of the outer race and for preventing joint rotation of the outer race. A bearing of this kind is particularly suitable for three-phase generators for motor vehicles.



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SPECIFICATION

A bearing device for shafts

- 5 The invention relates to a bearing device for shafts.

In electrical machines, and particularly in generators for motor vehicles, one of the two shaft bearings is generally in the form of a fixed bearing and the other is in the form of a loose bearing. The loose bearing is axially displaceable in order to provide the possibility of longitudinal compensation for the different extents to which the machine shaft and the machine housing expand in the case of fluctuating temperatures. The outer race of the loose bearing is normally mounted in the bearing housing so as to be displaceable. In order to prevent joint rotation of the outer race during operation of the machine, an O-ring is usually provided which is fixedly inserted between the outer race and the inner wall of the bearing housing. In order to prevent wobbling of the outer race in an axial direction, a corrugated spring is generally provided which abuts against the base of the bearing housing and which presses against the outer race; the outer race is thus biased in a direction towards the rotor of the machine that is away from the end of the shaft.

This hitherto conventional construction of the shaft bearing serving as a loose bearing has a number of disadvantages. Small movements of the outer race during operation of the machine cannot be prevented. The friction between the outer race and the corrugated spring and between the corrugated spring and the base of the bearing housing results in metal swarf which can enter to the raceway of the ball bearing and can lead to the destruction of the bearing. It is therefore necessary to seal the bearing at the base side of the bearing housing. The sealing means and the bearing act like a piston in a cylinder during assembly, so that the bearing has to be vented during assembly. Owing to the unavoidable slight movements of the outer race, the bearing seats of conventional machines tend to become enlarged during the course of time. Therefore, relatively very wide roller bearings have to be used in order to minimise the erosion of the bearing bush.

According to the present invention there is provided a bearing device for shafts of electrical machines, having a rolling element bearing incorporating an inner race and an outer race, an associated bearing housing, and a single element which serves to effect axial adjustment of the outer race, and to prevent rotation of the outer race.

In contrast to the prior art, the bearing device in accordance with the invention has the advantage that a substantially narrower bearing can be used to absorb the bearing forces with approximately the same contact

surface. A bearing of this kind is cheaper, simpler to mount and takes up less storage space. The volume made available by the narrow bearing can be used as an additional store for lubricating grease.

When the element is in the form of a ring made from soft plastics material the abrasion of metal is largely avoided. Furthermore, a ring of this kind resiliently absorbs movements of the outer race. The ring itself serves as the seal for the base side of the bearing housing. A further advantage is that the bearing device in accordance with the invention is readily interchangeable with conventional bearing devices. Alternatively a metal-reinforced bush can also be used as the resilient element. It is unnecessary to vent the bearing device at the base of the bearing housing.

The present invention will now be described 85 further by way of example only, with reference to the accompanying drawing which illustrates one embodiment of a bearing shaft according to the invention.

A bearing plate 11 includes a bearing housing 12 having a base 13. A ball bearing, comprising an outer race 14, balls 15 and an inner race 16, is fitted in the bearing housing 12. The outer race 14 is displaceable in the bearing housing 12. The inner race 16 is rigidly mounted on the end of a machine shaft 17.

A resilient ring 18 is interposed between the base 13 of the bearing housing and the outer race 14, one side of which ring abuts against the base 13 and its other side presses against the outer race 14. The external diameter of the ring 18 is somewhat smaller than the internal diameter of the bearing housing 12. The ring 18 has preferably a V-shaped cross section, the opening of the V being directed radially outwardly. The space between the journal of the shaft 17, the base 13 of the bearing housing 12 and the resilient ring is filled with lubricating grease 19 serving as a supply.

Thus the bearing is located by the element so as to prevent rotation of the outer race 14 and to effect axial adjustment of the outer race 14.

CLAIMS

1. A bearing device for shafts of electrical machines, having a rolling element bearing incorporating an inner race and an outer race, an associated bearing housing, and a single element which serves to effect axial adjustment of the outer race, and to prevent rotation of the outer race.

2. A bearing device as claimed in claim 1, in which the element is a resilient ring which has a preferably V-shaped cross section and whose external diameter is substantially equal to the internal diameter of the bearing bush.

3. A bearing device as claimed in claim 1 or 2, in which the resilient ring is interposed

between the outer race and the base of the bearing housing, one side of which ring abuts against the base and its other side abuts against the outer race.

- 5 4. A bearing device as claimed in claim 2 or 3, in which the opening of the V-shaped cross section of the resilient ring is directed radially outwardly.

- 10 5. A bearing device as claimed in claims 2, 3 or 4, in which the resilient ring is made from a soft plastics material.

6. A bearing device as claimed in any of claims 2 to 5, in which the space surrounded by the resilient ring serves as a storage space

- 15 for lubricating grease.

7. A bearing device as claimed in any preceding claim in which the rolling element bearing is a ball bearing.

- 20 8. A bearing device constructed and adapted to operate substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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